close to the time when facilities will be exhausted." AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 57.

Verizon argues that its Engineering Guidelines require an engineer to analyze non-interfaced plant when the feeder route will reach 85% fill within twelve months and also to "provide a solution" at that time. Verizon Exh. 122 (Verizon Recurring Cost Panel Surreb.) at 128. However, Verizon only quotes part of the Guidelines. While the Engineer must determine the solution when the feeder route has reached 85%, the solution does not have to be implemented until fill is near 100%. The Guidelines state that "Facility relief must be provided prior to the *critical exhaust date*." AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 57 (quoting Outside Plant Engineering Guidelines, 1998-00397-OSP, (July 20, 1998) at 10. And the Guidelines define the critical exhaust date "as that point in time when the current facilities available can no longer support the service demand in a given route" – in other words, when fill approaches 100%. *Id.* Similarly, GTE's Guidelines state that "relief projects are to be scheduled to complete as near to existing facility exhaustion or customer need as possible in order to maximize facility inventory utilization." AT&T Ex. 117 at 6. Thus, there is no need for an administrative spare of 15% even under Verizon's Engineering Guidelines.

Nonetheless, as shown above, the copper feeder fill factors in the Synthesis Model provide spare capacity that is sufficient to allow for a substantial administrative spare and more than three years of growth. As a result, the Synthesis Model actually overstates Verizon's cost for providing copper feeder. The Model bases price on mid-year 2002 demand because that is the mid-point in demand over the three year planning period. The Model thus calculates prices based on growth in demand expected to materialize over three years. If spare capacity is built into the Model that accommodates more than three years of growth, as in fact has been done, but the costs of that capacity are not spread over the additional projected demand, Verizon will over-recover its costs.

d. Copper Feeder Utilization in Verizon's Model

Verizon's also understates utilization for copper feeder in its own models. **[BEGIN VERIZON PROPRIETARY]** □□□□□□□□ □□□□ □□□□□ □□□ □□□□□□ □□□□□□ □□□□□□□□□□□ □□□ □□□□□ □□ □□□□□□□□□□ □□□□□ □□ □□□ □□□□□□□□□ □□ □□□□□ □□□□□□□□ **[END VERIZON PROPRIETARY]** This is far too low. In Mr. Riolo's experience, it is conservative to assume an 80% utilization rate for copper feeder. AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 62. Verizon's Mr. White stated that in his survey of 7% of the urban, suburban and rural feeder routes in Virginia the average feeder utilization was 80%. Tr. 4994-95, 5006-08 (White). Moreover, many of the unutilized pairs in Verizon's existing network are defective pairs. Verizon's data show that **BEGIN VERIZON PROPRIETARY ***** □□□ ***** END VERIZON PROPRIETARY** of the cable pairs in its network are defective. AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 63. A reconstructed network would have fewer than 1% defective pairs, which would alone increase utilization substantially above that which exists in Verizon's embedded network. *Id.*

Certainly, an efficient forward-looking network – even one built according to Verizon's own Engineering Guidelines -- would have utilization rates far above **[BEGIN VERIZON PROPRIETARY]** □□□ **[END VERIZON PROPRIETARY]** Verizon's Engineering Guidelines call for providing sufficient cable to allow for three to five years of growth. If a feeder route were relieved when utilization was 97% and five years of spare capacity were provided, the utilization of the route would be 82% immediately after relief for a route growing at the average growth rate in Verizon's network (3%).[144] *Id.* at 55-56, 58-59 & n. 48. The average utilization rate over the next five years would be 89.5%. A utilization rate of 80% is therefore conservative and allows sufficient capacity for growth, churn and breakage.

Moreover, as we have explained, an economic model should not provide spare capacity for growth without accounting for increased demand caused by that growth. Once again, Verizon provides spare capacity for growth but assesses costs as if no growth occurs.

e. Fiber Feeder Utilization in the Synthesis Model

The Synthesis Model uses a target fill factor of 100% for fiber strand. The Commission adopted this fill factor in its Model because fiber inherently contains spare that can be used for maintenance. Any growth in demand can be accommodated by changing the electronics on the end of the fiber without the need to add new fiber. *Universal Service Tenth Order* ¶ *208;* Tr. 4497 (Riolo).

Verizon criticizes this fill factor. It claims that fiber is generally manufactured in 12-ribbon strands and that fewer than 12 ribbons are needed in each RT, resulting in a fill of less than 100 percent. Verizon Exh. 109 (Murphy Reb.) at 86-87. Verizon's criticism is based on the effects of breakage necessitated by limitations on the size of fiber ribbons. But the target fill factors in the Synthesis Model constitute the inputs into the Model *prior* to breakage. The effects of breakage are then calculated by the Model. Verizon's criticism is therefore entirely inapposite, as the 100% target for fiber fill is not intended to take into account the effects of breakage. The Synthesis Model itself accounts for the effect of the ribbon structure as discussed by Verizon.

[144] If three years of spare capacity were put in place when the network was initially constructed, the minimum utilization would be 91%.

f. Fiber Feeder Utilization in Verizon's Model

Verizon significantly understates the utilization for fiber feeder even within the constraints of its own models. Verizon states that utilization of fiber feeder is only 41.8% in its own network and that Verizon uses this percentage in its models. Verizon explains that the of fiber feeder utilization is low because the 12-fiber ribbon structure requires the provisioning of excess strands. Verizon Exh. 107 (Verizon Cost Panel Dir.) at 110-12.

In a forward-looking network, however, all "excess" fibers from use of 12-fiber ribbons would be used to provide other services. **[BEGIN VERIZON PROPRIETARY]** [redacted] **[END VERIZON PROPRIETARY]** An efficient carrier would use other fibers to provide high speed business services. AT&T/WCOM Exh. 12 (AT&T/WorldCom Recurring Cost Panel Reb.) at 53-54. The carrier would lease still other fibers to CLECs as dark fiber.[145]

In a forward-looking network, there would be little, if any, spare fiber. Indeed, Verizon has informed CLECs that it intends to use all spare fibers in its network – so that CLECs are now complaining about the unavailability of dark fiber. WorldCom Exh.121 at 214-217. Moreover, GTE's Infrastructure Provisioning Guidelines state that **BEGIN VERIZON PROPRIETARY** [redacted] **END VERIZON PROPRIETARY**. Verizon's fiber feeder utilization rate is therefore too low.

[145] Verizon charges CLECs for unused fiber as part of the price of leasing UNEs for POTS services and then charges them again for that fiber if they lease dark fiber. Verizon cannot have it both ways.

g. RT Plug-In Utilization in the Synthesis Model

The FCC's Synthesis Model uses a single input for RT plug-in utilization, RT common equipment utilization, and copper feeder utilization. AT&T and WorldCom have not attempted to change that input, as the fill factors for RT plug-ins and common equipment are comparable to those proposed for copper feeder.

The Synthesis Model uses a fill factor for DLC equipment that is lower than necessary. The Model applies fill factors that range from 70 percent to 82.5 percent for RT plug-in utilization depending on the density zone. AT&T/WCOM Exh. 14 (Pitkin Surreb.) at 54. Given that Verizon itself claims that an 80% utilization level for plug-in equipment is appropriate, Verizon Exh. 109 (Murphy Reb.) at 90, Verizon has no basis for criticizing the plug-in utilization level in the Model.

h. RT Plug-In Utilization in Verizon's Model

Verizon's proposed plug-in utilization rate of 80% is itself too low. Unlike other fill factors proposed by Verizon, this rate is not based on plug-in utilization in Verizon's actual network, and the rate is inconsistent with Verizon's Engineering Guidelines. Thus, AT&T and WorldCom have modified that rate within Verizon's models to reflect a more accurate rate of 90%.

All parties agree that the plug-in channel units used with DLC are easy to install, requiring only a field visit, and that installation costs are very small relative to the cost of the plug-ins. AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 64; Verizon Exh. 107 (Verizon Cost Panel Dir.) at 107-08. Therefore, in accordance with industry standards, Verizon's Engineering Guidelines state that spare capacity should cover only 6 months of projected growth. AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 64. Based on Verizon's average growth rate of 3% a year, the utilization rate would therefore need to be 98.5% to provide for growth – and would be 98% in a 600 line unit even after breakage is taken into account. *Id.* at 64, 66; AT&T/WCOM Exh. 6 (Riolo Dir.) at 7-8, 37-38. Even if some additional plug-ins were left in place at recently vacated-premises, as Verizon posits, a utilization rate of 90% would easily be achievable on a forward-looking basis. AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 65.

Verizon asserts that 10% spare capacity is needed as an administrative spare. Verizon Exh. 122 (Verizon Recurring Cost Panel Surreb.) at 135. This is simply not so. After spare capacity is provided for growth and recently-vacated facilities, no additional spare capacity is needed, and Verizon provides no reason for such spare capacity. GTE's own guidelines state that "[T]ypical relief trigger for DLC line cards and common equipment will be 95%." AT&T Ex. 117 at E3. Thus, 90% utilization is conservative.

i. RT Common Electronics Utilization in the Synthesis Model

As with RT plug-ins, Verizon incorrectly presumes that the Synthesis Model does not apply a fill factor to RT Common Electronics. Verizon Exh. 109 (Murphy Reb.) at 89. In reality, the Synthesis Model applies a very conservative target fill factor of 70% to 82.5%, depending on density zone. AT&T/WCOM Exh. 14P (Pitkin Surreb.) at 54. Verizon does not propose any alternative fill factor.

j. RT Common Electronics Utilization in Verizon's Model

In its own models, Verizon assumes a utilization rate of 56.9% for common electronics when an 80% figure would be more reasonable. In support of its proposed fill factor, Verizon does not rely on the utilization rate for common electronics in its embedded network but instead assumes that the utilization rate for common electronics will be the same as that for copper feeder.

Verizon's own Engineering Guidelines show that its proposed utilization rate for common electronics is far too low. Verizon claims that 10% capacity is needed for an administrative spare, along with an additional three years of spare capacity to provide for growth. Verizon Exh. 122 (Verizon Recurring Cost Panel Surreb.) at 138. Even at that level, utilization would be 81% in a typical RT immediately after new capacity is provided with some additional spare capacity to account for breakage (100% - 10% administrative spare - 9% for growth (9% = 3 years growth at an average of 3% per year)). Moreover, Verizon provides no explanation why any spare capacity is needed for administrative spare. GTE's own guidelines state that "[T]ypical relief trigger for DLC line cards and common equipment will be 95%." AT&T Ex. 117 at E3.

Verizon's contention that the fill factor for common electronics should be the same as that for copper feeder is unfounded. Unlike copper feeder, common electronics can be installed shortly before the capacity of the existing equipment is reached. AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 67-68. *Cf.* Tr. 4502-04 (Gansert) (describing different characteristics of copper and fiber). Even if the utilization rates for copper feeder and common electronics were the same, Verizon would significantly understate the common electronics utilization rate because, as we have seen above, Verizon significantly understates its copper feeder utilization rate. Verizon bases its utilization rate on the copper feeder utilization rates in its existing network.

Verizon provides an example of what it calls "a *typical* size RT with 672 lines." Verizon Exh. 122 (Verizon Recurring Cost Panel Surreb.) at 139 (emphasis added). Once 605 of the lines (90% of 672) are in use, assuming a 10% administrative spare, a 224-line-relief shelf should be added, which would bring utilization down to 67.5%. But this means that even immediately after a relief job, this "typical" RT would have a utilization rate significantly above the **BEGIN VERIZON PROPRIETARY *** □□□*** END VERIZON PROPRIETARY** proposed by Verizon. Moreover, even presuming that Verizon were correct that utilization would be 67.5% after relief, the utilization would increase over time due to growth in the network until it again reached 90%. Thus, the average utilization in the RT would be (90% + 67.5%)/2 or 78.75%.

Verizon's example also assumes a starting point that would not exist in a reconstructed network, as customers would not be grouped together in a DA in such a manner that an entire 224-line shelf in the DA would be entirely empty. Thus, Verizon's example of a "typical" RT actually shows that utilization rates should be far higher than proposed by Verizon.

Finally, it is important to note that utilization of common electronics would be far higher in a forward-looking network than in Verizon's embedded network. In Verizon's existing network, as it has grown over time, many customers are grouped into DAs that are now inefficient – and result in excessive breakage. Approximately 15% of the DAs in the Virginia service territory have fewer than 50 working lines, for example, which results in extremely low utilization rates in these DAs. AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 17-18, 69-70.[146] In a reconstructed network, customers would be grouped to avoid such low utilization.

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[146] Verizon's claim that the small DAs result from transmission limitations and efficiency concerns, Verizon Exh. 122 (Verizon Recurring Cost Panel Surreb.) at 73, is entirely unsupported. Verizon provides no indication that it looked at any of these DAs to determine why fewer than 50 customers were included. As for Verizon's argument that only a small percentage of the total working lines are in these DAs, Verizon Exh. 122 (Verizon Cost Panel Surreb.) at 72, fifty lines was an arbitrary cutoff in AT&T and WorldCom's analysis. There are likely many other DAs in Verizon's network with 60 lines or 70 lines – still far too small for an efficient grouping.

k. Conduit Utilization in the Verizon Model

Conduit utilization is not an issue in the Synthesis Model. Within the Verizon models however, it is an important issue because Verizon substantially understates conduit utilization. Verizon develops conduit costs by calculating its investment in conduit between 1996 and 2000 in 2001 dollars, dividing that amount by the number of feet of duct installed during that same period to arrive at an investment per duct foot and then dividing by a utilization factor. Tr. 4256-57 (Gansert). Verizon calculates the utilization factor by dividing the number of feet of cable used in its embedded network by the number of feet of conduit laid in the embedded network as a whole to arrive at a utilization factor of **BEGIN VERIZON PROPRIETARY*** □□□ *** END VERIZON PROPRIETARY**. Tr. 4257-58 (Gansert). Verizon thus calculates its utilization rate over a far different time period than is used to calculate the unit cost of conduit. In addition, by basing its utilization rate on the ostensible rate in its embedded network, Verzion again provides significant spare capacity for growth without spreading its costs over both future and present customers.

Because Verizon determines the cost of conduit per line by dividing the unit cost of conduit, including trenching, by the utilization factor, the cost in Verizon's models is significantly affected by the utilization factor even though Verizon claims that the number of ducts installed in a trench has little impact on cost. Verizon Exh. 122 (Verizon Recurring Cost Panel Surreb.) at 143. Thus, it is important that Verizon understates conduit utilization.

Verizon's models provides substantial spare capacity for conduit even prior to application of the utilization factor. The cables traversing the conduit already include spare capacity through the application of cable utilization factors; the conduits inherently include spare capacity for fiber cables because each 4-inch conduit pipe can hold three or four fiber cables; and the utilization of fiber in conduit can be modified to serve additional demand by upgrading the electronics. AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 72.

Moreover, standard industry practice requires only one maintenance duct for an entire conduit section. *Id.* at 71. Verizon does not actually dispute this point, stating only that "a spare duct is necessary if the existing duct fails or floods." Verizon Exh. 122 (Verizon Recurring Cost Panel Surreb.) at 142. Nonetheless, in restating the costs in Verizon's models, AT&T and WorldCom conservatively provided at least one spare duct per conduit section and provided one spare foot of conduit for each foot of installed conduit. AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 73. This is more than enough spare capacity and substantially affects Verizon's costs.

10. Loop Electronics for DS-1 and DS-3 services

Verizon claims that the Synthesis Model does not include investment for electronic multiplexing equipment used for DS-1 and DS-3 services. Verizon Exh. 109 (Murphy Reb.) at 37. This is wrong. The Synthesis Model includes more than sufficient costs for the line cards needed for DS-1 and DS-3 service. AT&T/WCOM Exh. 14P (Pitkin Surreb.) at 49. As for Verizon's claim that the Synthesis Model does not build fiber to provide DS-1 and DS-3 service, Verizon Exh. 109 (Murphy Reb.) at 44, the fiber itself is very inexpensive and certainly costs less than the copper that the Synthesis Model does build.

11. 4-wire loops

In calculating the costs of 4-wire loops, AT&T and WorldCom evaluated the cost of the additional technology needed for 4-wire loops. They determined that at, as a result of higher DLC costs, feeder and distribution costs, and the addition of an overvoltage protector on the NID, a 4-wire loop costs 1.7 times more than a 2-wire loop. AT&T/WCOM Exh. 1 (Pitkin Dir.) at 24.

Verizon wrongly contends that this is inaccurate because a 4-wire loop would often terminate to businesses with larger NIDs or to inside terminals that are connected with drops. Verizon Exh. 109 (Murphy Reb.) at 40. But in Verizon's own cost study, there is only a $.07 difference between 4-wire and 2-wire NIDs. AT&T/WCOM Exh. 14P (Pitkin Surreb.) at 50.

Verizon also states that 4-wire loops cost more because, unlike 2-wire loops, they cannot use the concentration feature of GR-303. Verizon Exh. 109 (Murphy Reb.) at 41. However, the algorithms of the Synthesis Model do not presume concentration of DLC even for 2-wire loops; thus, the Model actually overstates costs. AT&T/WCOM Exh. 14P (Pitkin Surreb.) at 50.

Finally, Verizon contends that a 4-wire loop will require from 2 to 4 times as many channel units and plug-in slots as a 2-wire. Verizon Exh. 109 (Murphy Reb.) at 42. The fact that a 4-wire loop will require more slots in the channel bank assembly is irrelevant, however, as the channel bank assembly is quite inexpensive. It is the common control assembly that is the driver of common equipment costs and the capacity limitations of the common control assembly do not depend on shelf space occupied by plug-ins but rather on power, bandwidth and other limitations. It is reasonable to assume that DLC channel unit costs twice as much for a 4-wire loop (4 DS-0 equivalents) as for a 2-wire loop, AT&T/WCOM Exh. 18P (Riolo Surreb.) at 9-11, which AT&T and WorldCom used to calculate the ratio between costs for 2-wire and 4-wire loops.

12. Cost of support structure

a. Percentage of aerial/buried/underground

Outside plant mix represents the relative proportions of aerial, buried and underground cable. The Verizon models and Synthesis Model differ substantially in their assumed mix of aerial, buried, and underground structures for both feeder and distribution cable.

One of the key differences between the two models is that Verizon's outside plant mix assumptions are firmly rooted in its embedded plant. Tr. 4417 (Murphy).

Verizon's assumptions regarding the purportedly forward-looking mix of its outside plant are based upon a survey conducted by its outside plant engineers between 1993 and 1995. AT&T/WCOM Exh. 15 (Baranowski Surreb.) at 5-6; Tr. 4144 (Sanford); Verizon Exh. 122 (Verizon Recurring Cost Panel Surreb.) at 61. Verizon has offered no basis for the percentages that it has assigned to its outside plant mix other than to state that they reflect its historical experience.[147] However, Verizon has made no attempt to test whether its historical percentages will remain unchanged on a going-forward basis. As such, Verizon's assumptions regarding its outside plant mix are not forward-looking at all.

To further complicate matters, the design of Verizon's engineering survey is so fundamentally flawed that its results do not even accurately capture Verizon's actual embedded outside plant structure mix. The survey instructions directed respondents to "describe the "predominant" structure used for feeder and distribution cable within each Ultimate Allocation Area ("UAA"). AT&T/WCOM Exh. 112 (Response to AT&T/WorldCom 1-34); Tr. 4144-4145 (Sanford). For purposes of the survey, the "predominant" structure was defined as "the most likely type of structure that the next proposed cable will require." *See* AT&T WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 13; AT&T/WCOM Exh. 112 (Response to AT&T/WorldCom 1-34). Thus, the engineering survey was not designed to elicit accurate information regarding the precise composition of Verizon's embedded outside plant mix. Instead, the survey was designed to elicit nothing more than guesses about the "most likely type of structure that the next proposed cable will require." And if, on the basis of subjective judgment, an engineer "believe[d] that the predominant structure was underground," the survey

[147] *See, e.g.*, Tr. 4417 (Murphy) (stating that structure mix "should be based on the incumbent's existing experience").

recorded that 100% of the structure in the particular UAA was, in fact, underground structure. Tr. 4145 (Sanford). These basic flaws in the design of Verizon's engineering study virtually guaranteed inaccuracies in study results. Indeed, if 80% of the cable in every UAA was actually underground, the survey reported that *100%* of the structure in the particular UAA at issue was underground. Tr. 4144-45 (Sanford). The survey default also treated *all* distribution structure as buried whenever the survey respondent failed to specify the so-called "predominant" distribution structure type. AT&T/WCOM Exh. 12 (AT&T/WorldCom Recurring Cost Panel Reb.) at 13 n. 15. And, notably, buried plant is more expensive than aerial plant. *Id.*

Thus, the outside plant mix in Verizon's cost study is nothing more than a grab-bag of guesses by independent Verizon employees about which structure would be used for whatever cable Verizon happened to have in its planning pipeline approximately seven or eight years ago. And when Verizon employees could not even hazard a guess regarding the predominant structure in the particular UAA, Verizon just assumed that the structure was buried. Against this backdrop, Verizon's ill-conceived engineering survey does not accurately reflect Verizon's embedded structure mix and is of no probative value in assessing the appropriate forward-looking mix of support structures in Virginia. Moreover, Verizon has provided this Commission with no evidence demonstrating that its outside plant structure has remained unchanged since 1993-1995. For these reasons alone, the results of Verizon's engineering survey that serve as the factual underpinnings of Verizon's outside plant mix assumptions cannot and do not provide probative evidence of the appropriate contours of outside plant mix in a forward-looking environment.

(1) Feeder Cable Structure Mix

Verizon assumes that, in a forward-looking environment, the outside plant structure mix for feeder cable would consist of **[BEGIN VERIZON PROPRIETARY]** □□

□□□□□□ □□□□□□□□□□□ □□□ □□□□□□.[148] **[END VERIZON PROPRIETARY]** By contrast, the outside plant mix assumptions for feeder cable in the Synthesis Model vary by density zone. The Synthesis Model assumes that, in the lowest density zones, the support structure mix for feeder cable would consist of 5% underground, 60% buried, and 35% aerial, while in the higher density zones (5,000 - 10,000) the copper feeder structure mix would be composed of 40% underground, 35% buried, and 25% aerial. Verizon's analysis of structure mix for feeder cable is flawed because, *inter alia,* it does not vary by zone and erroneously assumes that, in a forward-looking environment, over half of all feeder cable would be underground.

In calculating the inpurts for structure mix, AT&T/WorldCom witness Joseph Riolo began with the existing structure mix taken from ARMIS data. Because that data was not divided by density zones, Mr. Riolo had to determine the appropriate mix for each zone so that the overall mix across all zones was consistent with the ARMIS data. AT&T/WCOM Exh. 6 (Riolo Dir.) at 40-42; Tr. 4653-55 (Riolo). The Synthesis Model correctly recognizes that underground feeder is not often used outside of dense, urban areas. Indeed, underground conduit is more expensive than buried or aerial structure. AT&T WCOM Exh. 18P (Riolo Surreb.) at 16. Additionally, working underground poses more hazards than working with aerial or buried cable. Furthermore, production time associated with underground work is generally greater than that associated with aerial or buried structure. *Id.;* AT&T/WCOM Exh. 6 (Riolo Dir.) at 40-42. Because dense, urban environments consist of buildings and pavement rendering cable trenching operations costly and impractical, underground conduits/manholes are a reasonable alternative in these environments. AT&T/WCOM Exh. 6 (Riolo Dir.) at 42; AT&T/WCOM Exh. 18P (Riolo Surreb.) at 16. However, given the high costs, safety issues, and productivity time associated with underground structure, it would be counterintuitive for any efficient firm to place the

[148] Verizon Exh. 100 (Verizon Cost Study, Part B-1, Section 4 Study Details, Subsection 4.8 Plant Characteristics by Cell and Jurisdiction at 2).

majority of its feeder cable in locations other than dense, suburban areas. Indeed, Verizon's own guidelines strongly discourage the installation of underground structure. AT&T/WCOM Exh. 18P (Riolo Surreb.) at 16. For these reasons, Verizon's assumption that more than half of its feeder cable would be placed underground in a forward-looking environment is plainly erroneous.

(2) Distribution cable structure mix

The parties also disagree on the structure mix for distribution cable. Verizon's structure mix for distribution cable is composed of **[BEGIN VERIZON PROPRIETARY]** □□□ □□□□□□ □□□□□□□□□□ □□□□ □□□□□□.[149]**[END VERIZON PROPRIETARY]** In contrast, using the percentage breakdown between aerial and buried cable in Verizon's ARMIS report, the Synthesis Model assumes that, in lower density zones, the structure percentages for copper distribution cable would consist of 35% aerial, 64% buried, and 1% underground. AT&T/WCOM Exh. 6 (Riolo Dir.) at 40. In the highest density zones, the Synthesis Model assumes that the distribution cable structure would consist of 25% pole lines, 35% intra-building cable (which is both intra-building cable and block cable), 35% buried and 5% underground structure. *See* AT&T/WCOM Exh. 6 (Riolo Dir.) at 40; AT&T/WCOM Exh. 14 (Pitkin Surreb.) at 60.

Verizon's structure mix for distribution cable overstates the percentage of underground cable. Indeed, Verizon's assumption that 18% of the distribution cable is underground is at odds with the testimony of Verizon's witness during a recent hearing in New Jersey who admitted that there is "'very, very little'" underground cable in the distribution

[149] Verizon Exh. 100 (Verizon Cost Study, Part B-1, Section 4 Study Details, Subsection 4.8 Plant Characteristics Results by Cell and Jurisdiction at 1).

portion of the plant. AT&T/WCom Exh. 12 (AT&T/WorldCom Recurring Cost Panel Reb.) at 74.

Moreover, Verizon's criticisms regarding the structure mix for distribution cable proposed by AT&T/WorldCom are meritless. Verizon contends that the distribution structure mix advocated by AT&T/WorldCom is erroneous because the Synthesis Model does not specifically engineer intra-building riser cable when calculating loop costs. Verizon Exh. 109 (Murphy Reb.) at 108. Verizon's arguments cannot withstand scrutiny.

The Synthesis Model treats all customer locations as separate, physical locations. AT&T/WCOM Exh. 14 (Pitkin Surreb.) at 55. As a consequence, the Synthesis Model, in all likelihood, substantially overstates route distances in high-density areas by including cable that would otherwise be riser cable. *Id.* Although riser cable requires no structure, the Synthesis Model assigns aerial cable structure to intra-building cable since aerial facilities have the lowest structure costs in the higher density zones. This already overstates costs for riser cable. The assignment of underground or buried structure to intra-building cable would have further inflated costs. *Id.* at 55.

b. Structure Sharing

The Synthesis Model accounts for several types of sharing opportunities that would be available in the forward-looking network, including: (1) the sharing of cable supporting structures (such as poles, ducts, and conduits) between the ILEC and other entities, such as power companies and cable TV carriers; (2) the sharing of structure between feeder and distribution facilities; and (3) the sharing between the ILEC's interoffice facilities and feeder. Verizon claims that the Synthesis Model's assumptions regarding the opportunities for structural sharing opportunities with other entities, as well as the levels of structure sharing between feeder and distribution facilities, are overblown. Verizon Exh. 109 (Murphy Reb.) at 94. Verizon is wrong.

(1) Sharing with other users

In the past, ILECs and other regulated monopolists had little incentive to participate in structure-sharing arrangements since such sharing would have reduced the underlying ratebase upon which their rates of return were computed. Because Verizon has operated as a regulated monopolist with virtually no market pressure from competitors, it has not been compelled to eliminate the monopolistic inefficiencies in its system. AT&T/WCOM Exh. 14 (Pitkin Surreb.) at 26. However, in a forward looking environment, an efficient new competitor would actively seek to reduce its outside plant costs by spreading such costs across users and other utilities. Furthermore, to minimize the disruptions due to multiple trenching and excavation operations, municipalities generally encourage structure sharing activities. As a consequence, in a forward-looking network, the efficient entrant would have every incentive to participate in structural sharing.[150]

The Synthesis Model assumes that, in the lowest density zone, the ILEC would assume 50% of aerial structure costs, while in the highest density zone, the ILEC would assume 25% of the aerial structure costs. Verizon asserts that the Synthesis Model's assumptions regarding the opportunity for sharing of aerial structure with other users are "unrealistic." Verizon Exh. 109 (Murphy Reb.) at 97. In that connection, Verizon's cost study assumes that approximately **[BEGIN VERIZON PROPRIETARY]** □□□ **[END VERIZON PROPRIETARY]** of its poles would be shared with electric utility companies in the forward-looking environment. Verizon Exh. 100 (Verizon Cost Study, Part B-1, Section 3 Study Inputs,

[150] *See e.g.,* Tr. 3217 (Murray); AT&T/WCOM Exh. 12P (AT&T/WCOM. Recurring Cost Panel Reb.) at 76-78; Tr. 4378-79 (Baranowski); Tr. 4384-86 (Riolo); AT&T/WCOM Exh. 6 (Riolo Dir.) at 10-12; AT&T WCOM Exh. 18P (Riolo Surreb.) at 15-18.

Subsection 3.2 Study Factors at 2). Verizon's study understates the opportunities for aerial structured sharing.

Typically, the telephone company and the power company share ownership of the pole. Because the power company must assure that its high-voltage conductors are safely separated from the wires of low-power users that attach to the pole, the power company generally occupies a larger portion of the pole space than the telephone company. Instead of installing their own facilities, other users such as cable television companies generally lease low voltage pole space, thereby further reducing the ILEC's structure costs. Moreover, the opportunities for aerial structure sharing should only increase as new low-power and facilities-based service providers enter the marketplace. Given the current prevalence of aerial structural sharing arrangements with telephone companies, power companies and CATV companies and the increased opportunities for such sharing with competitive entry, Verizon's assumptions regarding aerial structure – which only reflect the sharing of aerial facilities with electric utilities – are unreasonable. AT&T/WCOM Exh. 18P (Riolo Surreb.) at 18.

Furthermore, Verizon's cost study also does not properly account for the sharing of buried or underground trenches. *See* AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 76; Tr. 4377-79 (Baranowski). Verizon claims that the net costs of its buried cable reflect any savings attributable to sharing the buried trench facility with other users. Tr. 4379-80 (Gansert). However, because of the way Verizon's model is constructed, it is impossible to verify what portion, *if any*, of Verizon's installed cable costs reflect savings attributable to shared buried trenching operations. Tr. 4378-79; 4390 (Baranowski). Further, Verizon's study erroneously assumes only *de minimis* sharing of trenches in underground plant. AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 76-77.[151]

In a forward-looking environment, it is clear that the ILEC will enjoy savings associated with the sharing of buried trench facility. AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 76. Because of the substantial costs involved in trenching operations, companies routinely search for partners that can share trenching costs. Tr. 4384-85 (Riolo). Indeed, joint buried arrangements involving utility companies, telephone companies, communications providers, and municipal agencies are quite common in the industry. Tr. 4385 (Riolo) (referring to evidence of twenty to thirty entities participating in joint buried operations in Fairfax County alone). In new building construction, it is not uncommon for builders to dig trenches at their own expense and place the cables of telephone, power, and cable television companies in the trenches — provided the companies supply the materials in advance. AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 77. As a consequence, buried trenches are frequently available to the ILEC free of charge. For these reasons, AT&T/WorldCom's assumption of three-way sharing of the trenching costs associated with buried plant is reasonable. Tr. 4384-86 (Riolo). Significantly, at hearing, Verizon conceded that it has "*no argument*" regarding the conclusions reached by AT&T/WorldCom concerning the opportunities for sharing the *buried* trench facility in a forward-looking environment. Tr. 4386 (Gansert) (emphasis added). Thus, by Verizon's own admission, AT&T/WorldCom's assumptions regarding the sharing of trenching costs are, in fact, eminently reasonable.

[151] *See, e.g.,* Verizon Exh. 122 (Verizon Recurring Costs Panel Surreb.) at 148-149 (noting that based upon Verizon's historical experience in installing conduit, there are "only limited opportunities to share trenching costs with other utilities)."

However, the parties sharply diverge regarding the opportunities for sharing trenching costs in underground plant. Verizon categorically dismisses the notion that such opportunities would exist in the forward-looking environment. Indeed, Verizon claims that there is absolutely no reason why any company would rationally seek to share underground trenching costs. Tr. 4386-4387 (Gansert). Furthermore, Verizon asserts that, in a scorched mode environment, there should be no opportunities for sharing underground trenching costs since it would not be feasible to coordinate such sharing with other utilities. *Id.* Verizon is simply wrong.

Despite Verizon's assertions to the contrary, underground plant provides ample opportunities for structure sharing arrangements. Typically underground structure is located in densely populated areas where the high costs associated with pavement restoration make it attractive to place conduits underground and, thereby, avoid further excavations. Underground conduit is generally the most expensive structure per foot, with most costs attributable to trenching operations. As a consequence, companies actively seek to take advantage of underground trenching sharing arrangements. AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 77-78.

Thus, for example, road widenings — which occur with great frequency — offer substantial opportunities for sharing underground trenching costs. When roads are widened and encroach on spaces occupied by a pole line, companies sharing space on the pole line frequently place their facilities underground, share the underground trenching costs, and avoid the costs associated with the installation of a new pole. Tr. 4388-89 (Riolo). In addition, many municipalities discourage indiscriminate opening of streets and sidewalks. For these reasons, many companies seek opportunities to share the trench into which underground conduits are placed. AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 77-78; Tr.

4388-89 (Riolo). As a consequence, the Synthesis Model reasonably assumes two-way sharing of the underground trench.

Moreover, this Commission has already rejected the notion that the need for coordination among users in a scorched-node environment would render it impossible for an ILEC to participate in underground structure sharing arrangements, stating:

> Commentors contend that if the model assumes that everything is in place except for the telecommunications network, then the sharing percentage used in the model should reflect fewer opportunities for sharing because it would not be possible to coordinate sharing with other utilities in the development of a new network. In particular, opportunities for sharing of underground and buried structure would be limited… While this may provide an interesting topic for academic debate, we do not believe it to be particularly useful or relevant in determining the structure sharing values in this proceeding.
>
> We note that, as part of the logical argument that the entire telephone network is to be rebuilt, it is also necessary to assume that the telephone industry will have at least the same opportunity to share the cost of building plant that existed when the plant was first built. We also note that cable and electric utilities continue to deploy service to new customers and replace existing technologies which provides an opportunity for carriers to share structure.
>
> *Universal Service Tenth Order at ¶244 n.504.*

(2) Sharing of feeder and distribution structure

While conceding that feeder and distribution cables can share structure, Verizon asserts that the amount of sharing is limited. *See, e.g.*, Verizon Exh. 109 (Murphy Reb.) at 98. In this regard, Verizon contends that AT&T/WorldCom's proposed levels of sharing between feeder and distribution structure are unrealistic because even when feeder and distribution plant follow the same route, most feeder is generally placed underground, while distribution cable is buried or aerial. *Id.* at 99. Notably, although Verizon admits that sharing of feeder and distribution structures occurs and criticizes AT&T/WorldCom's assumptions regarding such sharing opportunities, Verizon proposes no alternative adjustments of its own. AT&T/WCOM Exh. 14P (Pitkin Surreb.) at 59-60. Moreover, Verizon's criticisms of AT&T/WorldCom's assumption are demonstrably unsound.

The sharing of structure between feeder and distribution facilities is an important element of efficient outside plant design. AT&T/WCOM Exh. 1 (Pitkin Dir.) at 22; Tr. 4538-39 (Pitkin). The high cost of support structure has prompted firms to seek out such sharing of structure. Moreover, in a TELRIC environment, an efficient entrant would take full advantage of this cost-effective method of provisioning facilities. AT&T/WCOM Exh. 14 (Pitkin Surreb.) at 60. Thus, for example, BellSouth's cost model submitted in Florida Docket No. 990649-TP revealed that feeder and distribution facilities share approximately 15% of the total route distance produced by the model, and that 74% of the feeder route is shared with distribution facilities. AT&T/WCOM Exh. 1 (Pitkin Dir.) at 23; AT&T/WCOM Exh. 6 (Riolo Dir.) at 13. Similarly, BellSouth's cost model submitted in Louisiana Docket No.U-24714A revealed that distribution facilities and feeder share approximately 20% of the route distance produced by the model, and that 74% of the feeder route is shared with distribution facilities. AT&T/WCOM Exh. 1 (Pitkin Dir.) at 23; AT&T/WCOM Exh. 6 (Riolo Dir.) at 13-14.

The Kansas Corporation Commission recently recognized that the universal service costs should reflect such sharing arrangements. In examining the placement of feeder and distribution cable for certain wire centers, the Kansas Corporation Commission recognized that "at least 40% of the feeder routes also included distribution cable."[152] Thus, failure to account for shared feeder and distribution facilities would overstate return costs. AT&T/WCOM Exh. 1 (Pitkin Dir.) at 23.

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[152] Order 16: Determining the Kansas-Specific Inputs to the FCC Cost Proxy Model to Establish a Cost-Based Kansas Service Fund, Docket No. 99-01MT-326 - GIT, ¶¶ 52, 54.

The Synthesis Model reduces the default input values for feeder aerial, buried and underground structure by 40% to reflect the level of structure sharing between feeder and distribution plant in a forward-looking environment. Tr. 4538-39 (Pitkin). This approach is entirely reasonable. When feeder and distribution follow the same route, the feeder and distribution facilities will and should use the same structure. AT&T/WCOM Exh. 18P (Riolo Surreb.) at 16. Indeed, it is illogical for Verizon to assume that, in a forward-looking TELRIC environment, an efficient firm would place its telephone feeder in costly underground conduit and then place parallel distribution plant (that serves the same customer base) in a different structure type. AT&T/WCOM Exh. 18P (Riolo Surreb.) at 16; Tr. 4388-89 (Riolo).

Furthermore, Verizon is wrong when it contends that, in a forward-looking environment, the CLEC would place the majority of its feeder cable underground. AT&T/WCOM Exh. 18P (Riolo Surreb.) at 16. Structure represents a substantial portion of the costs of cable construction. *Id.* at 17. The routes in which feeder cables run extend from the Central Office to the boundaries of the wire center. *Id.* These routes are also populated with other utilities. It is absurd for Verizon to suggest that, in a forward-looking environment, an efficient firm would *reduce* any opportunities for sharing structure with utilities (that have the same customer base as the ILEC) by placing most of its feeder underground. *Id.* In addition, underground feeder is not often used outside of dense urban areas. *Id.* at 16. Notably, Verizon's own engineering guidelines state that **[BEGIN PROPRIETARY]** □□□□□□□ □□□□□□□□□□□□□ □□□□□□□□□□□ □□ □□□□□□□□□□ □□□□ □□ □ □□□□ □□□□□□□□ **[END PROPRIETARY]** *Id.* at 16 (citation omitted). For all of these reasons, Verizon's assumption that most feeder cable would be placed underground in a forward-looking environment is untenable. *Id.* at 17; Tr. 4388-89 (Riolo).

Verizon's criticism of the structure-sharing assumptions of the Synthesis Model, when reduced to its simplest terms, is nothing more than a complaint that the assumptions do not mirror the degree of sharing that Verizon currently experiences on its embedded network.[153] On a forward-looking basis, however, the percentages of shared structures will dramatically increase. An efficient new entrant will have significant and legal incentives to engage in structure sharing to a greater extent than Verizon, or any other monopolist, would today. These facts dispel the notion that a forward-looking firm would restrict itself to the limited levels of sharing assumed in Verizon's cost study.

c. Issues regarding conduit, poles and drop

(1) Conduit investment

The conduit investment in Verizon's study is overstated. In calculating its conduit investment, Verizon uses a unit cost that is applied to the number of conduit miles generated by the UAAA model. AT&T/WCOM Exh. 12 (AT&T/WorldCom Recurring Cost Panel Reb.) at 73. In determining the overall cost of conduit, Verizon uses an historical average of Verizon's intalled conduit costs in Virginia between 1996 and 2000. *Id.* at 40. By relying on this historic average, Verizon ignores incontrovertible evidence that the average installed cost of conduit per foot has declined as the amount of conduit has increased, thereby demonstrating economies of scale in conduit installations. *Id.* 40-41. Thus, for example, in 1997, Verizon installed **[BEGIN VERIZON PROPRIETARY]** □□ □□□□□□ □□ □□□ □□□□ □□ □□□□□ □□□ □□□□ □□ □□□□□□□ □□ □□□□□□ □□□□□□□□ □□□□□ □□ □□□□□□ □□ □ □□□□ □ □□□□□□□ **[END VERISON PROPRIETARY]** *Id.* Because the conduit requirements of the forward-looking network will far exceed the length of conduit installed by Verizon in any given year, it is

[153] *See, e.g.*, Tr. 4417, 4383 (Murphy).

appropriate to use the cost per foot associated with the greatest length of conduit installed which was in 1998.

Verizon attempts to diminish the significance of its declining installed conduit costs by relying on little more than rank speculation. Verizon contends that the declining installed conduit costs identified by AT&T/WorldCom reflect nothing more than the "unique characteristics" of particular installation projects during a given year. Verizon Exh. 122 (Verizon Recurring Cost Panel Surreb.) at 102-103. Conspicuously absent from Verizon's pre-filed testimony is any empirical evidence demonstrating that such variables affected conduit costs. The reason for this glaring omission is perfectly understandable. During the hearing Verizon confirmed that it has conducted no study demonstrating that its declining conduit costs are attributable to any variable other than the miles of conduit installed. Tr. 4259 (Sanford).

Other evidence suggests that Verizon has overstated its conduit investment costs. Indeed, it appears that the amount of underground plant in Verizon's cost study is overstated. Verizon's cost study identifies over **[BEGIN VERIZON PROPRIETARY]** □□□ **[END VERIZON PROPRIETARY]** of its distribution plant as underground. Verizon Exh. 100 (Verizon Cost Study, Part B-1, Section 4 Study Details, Subsection 4.8 Plant Characteristics Results by Cell and Jurisdiction at 2). However, during a hearing in New Jersey, Verizon's witness admitted that there is "very, very little" underground cable in the distribution portion of the plant. AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 74 (footnote omitted). Thus, Verizon's testimony in New Jersey suggests that Verizon's conduit investment costs are overstated.

In all events, in view of the economies of scale associated with the installation of conduit, the cost of conduit installation should not be based on the average cost of Verizon's historical duct installations, but rather the costs based upon the largest number of conduit miles installed in an individual year — a number far less than the number of conduit miles that would be installed in a TELRIC reconstructed network.[154] As a consequence, AT&T/WorldCom have used Verizon's installed cost per conduit foot of **[BEGIN VERIZON PROPRIETARY]** □□□ **[END VERIZON PROPRIETARY]** as the appropriate starting point for calculating conduit investment costs.

(2) Pole Investment

Similarly, Verizon's purported forward-looking pole investment is overstated because it too relies on Verizon's historical experience in installing poles in Virginia between 1996 and 2000. *See* AT&T/WCOM Exh. 12 (AT&T/WorldCom Recurring Cost Panel Reb.) at 42; Verizon Exh. 122 (Verizon Recurring Cost Panel Surreb.) at 104 (noting that Verizon's "actual experience with pole installation over the years provides a sound and testable starting place for estimating forward - looking pole costs"). Because Verizon's pole installations over the past few years are not comparable in scope to those expected in a TELRIC, scorched-node environment, they cannot possibly reflect the economies of scale the forward-looking entrant can attain in installing poles sufficient to meet total demand. Pole installations in the forward-looking, scorched-node TELRIC environment would capture the efficiencies realized from sequential installation and minimization of mobilization and demobilization. AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 42. AT&T and WorldCom have used the more appropriate forward-looking pole investment developed by the Commission and used in its Synthesis Model.

Moreover, Verizon's criticisms of the forward-looking pole investment proposed by AT&T/WorldCom are meritless. Verizon maintains that, in a scorched-node, TELRIC

[154] Verizon also inappropriately applies its embedded duct utilization factors to the conduit investment which results in overstated forward-looking costs. *See also* AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 71.

environment, instantaneous pole installations would be prohibitively expensive because rush job premiums and a scarcity of laborers and poles would drive up costs. Tr. 4095-4100. Verizon's argument borders on the frivolous. Verizon's cost study includes the costs of installing poles on a piecemeal basis and during emergencies -- costs that Verizon concedes are higher than those incurred when pole installations are planned in advance. Tr. at 4094-96. Clearly, in a forward-looking environment, a new, efficient entrant would seek to maximize the efficiencies and economies associated with planned pole installation and would not adopt a piecemeal approach to pole installation.

(3) Drop length

In Verizon's models, Verizon's loaded investment cable price ostensibly includes its drop investment. Tr. 4367 (Sanford). Because of the model's design, however, it is impossible to determine the average drop length that is factored into Verizon's loaded investment price.

Verizon asserts that the Synthesis Model grossly understates the average drop length. Verizon Exh. 109 (Murphy Reb.) at 104. In this regard, Verizon claims that, based upon its calculations, the Synthesis Model produces a drop length of 23.8 feet, which it asserts is less than half of the average drop length when the Synthesis Model is run using the Commission's default values. Verizon also notes that, based upon the HAI model, the average drop length should be 73 feet. *Id.* at 100. Verizon's analysis cannot withstand scrutiny.

Verizon reaches this misguided assumption because it divides the total drop length generated by the Synthesis Model by the number of lines, instead of the number of drops. AT&T/WCOM Exh. 14P (Pitkin Surreb.) at 39-40. If Verizon had calculated the drop length properly, it would have calculated an average drop length of 77.4 feet for the Synthesis Model which is actually slightly higher than the drop length that Verizon deems appropriate. *Id.* at 40.

13. Loop Repair and Maintenance Expenses

In a TELRIC environment, repair and maintenance[155] expenses should be based on a new, efficient outside plant facility. Verizon calculates its maintenance and repair expenses by taking its expenses in Virginia in 1999 and bringing those expenses to 2001 levels through, *inter alia,* inflation and productivity adjustments. Verizon's calculation of the maintenance and repair expenses for metallic cable is based on the embedded relationship of its current metallic cable repair and maintenance expenses to its embedded metallic cable investment.[156] Thus, the high costs of Verizon's aging, deteriorated, embedded plant forms the basis of Verizon's calculations of its maintenance and repair expenses. AT&T/COM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 89.

Before computing its expense to investment ratio, Verizon adjusts its actual repair expenses by five percent ostensibly to account for reduced repair expenses associated with a new metallic cable facility.[157] Notably, Verizon's five percent downward adjustment applies *only* to copper cable repair expenses. Tr. 3808, 3887 (Minion). Further, with the exception of purported adjustments for inflation and productivity,[158] Verizon makes *no* downward adjustment to its maintenance expenses. *See* Verizon Exh. 107 (Verizon Cost Panel Dir.) at 63. Indeed, Verizon claims that, "given existing technology and processes and reasonable foreseeable developments,"

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[155] Maintenance expenses (otherwise known as "M" dollars or "rearrangement" expenses) are those expenditures relating to the rearrangement of facilities. "R" dollars are expenses incurred in repairing plant facilities. Tr. 3897-3898 (Riolo).

[156] AT&T/WCOM Exh. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 88; Tr. 3767-3768 (Minion).

[157] Tr. 3782, 3807-3808, 3886 (Minion); Verizon Exh. 12 (Verizon Recurring Cost Panel Surreb.) at 34.

[158] *See, e.g.*, Verizon Exh. 122 (Verizon Recurring Cost Panel Surreb.) at 22. Moreover, the so-called adjustments that Verizon makes for productivity are based upon Verizon's "experience in its embedded network from year to year." Indeed, by it's own admission, Verizon has made no adjustments to its values to reflect productivity gains expected in the forward-looking network. Tr. 3795-3796 (Minion).